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10/634,141	08/04/2003	Ilya V. Karpov	ITO.0554US (P16589)	5089
21906 7590 06/08/2007 TROP PRUNER & HU, PC 1616 S. VOSS ROAD, SUITE 750 HOUSTON, TX 77057-2631			EXAMINER LEE, EUGENE	
			ART UNIT 2815	PAPER NUMBER
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.



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**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Application Number: 10/634,141  
Filing Date: August 4, 2003  
Appellant(s): KARPOV

**MAILED**  
**JUN 08 2007**  
**GROUP 2800**

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Timothy N. Trop  
For Appellant

**EXAMINER'S ANSWER**

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This is in response to the appeal brief filed 5/9/06 appealing from the Office action mailed 12/27/05.

**(1) Real Party in Interest**

A statement identifying by name the real party in interest is contained in the brief.

**(2) Related Appeals and Interferences**

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

**(3) Status of Claims**

The statement of the status of claims contained in the brief is correct.

**(4) Status of Amendments After Final**

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

**(5) Summary of Claimed Subject Matter**

The summary of claimed subject matter contained in the brief is correct.

**(6) Grounds of Rejection to be Reviewed on Appeal**

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The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

**(7) Claims Appendix**

The copy of the appealed claims contained in the Appendix to the brief is correct.

**(8) Evidence Relied Upon**

6,545,287 B2	CHIANG	4-2003
6,117,720	HARSHFIELD	9-2000

The following ground(s) of rejection are applicable to the appealed claims:

**(9) Grounds of Rejection**

***Claim Objections***

1. Claim 10 is objected to because of the following informalities: claim 10 is dependent on a cancelled claim. Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

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3. Claims 32 thru 37 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The term "sublithographic" is a relative term that renders the claim indefinite. The term "sublithographic" is not defined by the claims, the specification does not provide a standard for ascertaining the requisite degree, and, therefore, one of ordinary skill in the art at the time of invention would not be reasonably apprised of the scope of the invention. The metes and bounds of the term "sublithographic" are unclear, and not known how "small" a pore or otherwise has to be in order to be categorized as "sublithographic". Appropriate clarification and/or correction are required.

*Claim Rejections - 35 USC § 103*

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1, 4, 8, 10, and 32 thru 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chiang 6,545,287 B2 in view of Harshfield 6,117,720 in view of Hudgens et al. 6,507,061 B1. Chiang discloses (see, for example, FIG. 7) a phase-change memory cell comprising a pore 31, insulating layer (insulator) 14, sidewall spacer 24, heater 22, and phase change material 18. Chiang does not disclose removing the upper portion of said heater to form a gap. However, Harshfield discloses (see, for example, FIG. 4 and 5) a memory cell comprising

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the steps of removing a plug 61 below at top surface 56. In column 4, lines 36-44, Harshfield discloses the plug is recessed below the top surface to form the base portion (heater) 42 and leave free the upper cavity portion 54. In FIG. 6, a chalcogenide material (phase change material) 45 is inserted into the upper cavity. It would have been obvious to one of ordinary skill in the art at the time of invention to remove the upper portion of said heater to form a gap in order to use another method (that permits overdepositing) that forms a free cavity wherein a phase change material may be adequately deposited.

Chiang in view of Harshfield does not disclose patterning and etching said phase change material over said insulator. However, Hudgens discloses (see, for example, FIG. 1) a phase-change memory comprising a phase change material 22. In column 3, lines 25-27, Hudgens discloses the patterning and etching of the phase change material to form the phase-change memory. It would have been obvious to one of ordinary skill in the art at the time of invention to pattern and etch said phase change material over said insulator in order to remove any excess material in the phase change memory.

Regarding claim 4, see, for example, column 4, lines 28-33 wherein Harshfield discloses any excess material above the top surface 56 of dielectric volume 50 is removed by a mechanical planarization. It would have been obvious to one of ordinary skill in the art at the time of invention to planarize the upper surface of said insulator in order to keep the insulating layer flat and without any structural defects.

Regarding claim 8, see, for example, FIG. 7 wherein Chiang discloses the phase change material having a T-shape.

Regarding claim 10, see, for example, column 3, lines 53-55 wherein Chiang discloses the heater 22 being made of titanium nitride (metal). Chiang discloses (see, for example, FIG. 4, and 5) that the titanium nitride is deposited in the pore after forming the spacer 24.

#### **(10) Response to Argument**

Regarding the appellant's argument on the top of page 10 of the appeal brief filed 5/9/06 that there is nothing indefinite about the idea of a spacer or its ability to define sublithographic dimensions, this argument is not persuasive. The term "sublithographic" is never defined, much less used, in the appellant's disclosure until first and only appearing in the amendment/response filed 10/3/05 for amended claims 32, and 33. The appellant never defines the term "sublithographic" except in the arguments sections filed in the appeal brief filed 5/9/06 and amendment/response filed 10/3/05. Therefore, the term "sublithographic" is unclear, and its metes and bounds can not be defined, because the term is never disclosed in the specification.

Regarding the appellant's argument on bottom of page 10 that none of the cited references teach any reason to use a sidewall spacer to enable removing an upper portion of the heater to from a gap, this argument is not persuasive. The claims only state "forming a sidewall spacer in said pore", and "forming a heater in said po11007352re with said sidewall spacer." The "reason" why the sidewall spacer is used is not relevant since the claims are only directed towards the method and the function of why a sidewall spacer is used does not have anything to do with the method steps stated in the claims. Whether Harshfield teaches forming the sidewall spacers after removing a portion of the heater is not pertinent since Chiang already discloses spacers, and, Harshfield is only used to show that another method of forming the heater is well

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known in the art. The removal of the heater can clearly be done with or without the spacer by etching (see, for example, column 4, lines 38-40 of Harshfield) and therefore, the process step of removing the upper portion of the heater, as disclosed by Harshfield, is disclosed in Chiang in view of Harshfield.

Regarding the applicant's argument that Chiang does not teach the claimed solution, this argument is not persuasive. It does not matter whether Chiang teaches anything about why it would be better to form the sidewall spacer first or second and why one would want to use a sidewall spacer in connection with the formation of a heater of one thickness prior to its subsequent thickness reduction because Chiang already discloses forming a sidewall spacer and heater as disclosed in the applicant's claims without any reference to sequential order. Harshfield discloses the step of removing an upper portion of said heater. Harshfield is only used to show that another method of forming the heater is well known in art and whether the spacer is formed first or second does not remove the fact that Chiang already discloses spacers and that Harshfield's method of forming the heater is not dependent on whether spacers are present.

#### **(11) Related Proceeding(s) Appendix**

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.



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For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

Eugene Lee



**EUGENE LEE  
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